

REMARKS

This responds to the Office Action mailed on June 22, 2006. In this response, no claims are amended, canceled, or added. As a result, claims 1-42 remain pending in this application. Applicant requests reconsideration of this application in view of the following remarks.

§102 Rejection of the Claims

Rejection: Claims 1-4, 6-16, 17-21, 36-39, and 40-42 were rejected under 35 USC § 102(e) as being anticipated by Kenny et al. (US 2004/0112571 A1).

Response: Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration. *In re Dillon* 919 F.2d 688, 16 USPQ 2d 1897, 1908 (Fed. Cir. 1990) (en banc), cert. denied, 500 U.S. 904 (1991). It is not enough, however, that the prior art reference discloses all the claimed elements in isolation. Rather, “[a]nticipation requires the presence in a single prior reference disclosure of each and every element of the claimed invention, *arranged as in the claim.*” *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984) (citing *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983)) (emphasis added).

Claim 1 recites “...a plurality of micropins thermally coupled to the substrate, the plurality of micropins arranged in a pixel like pattern over the substrate, the micropins positioned to cause a fluid passing through the plurality of micropins to travel a nonstraight path.” The Kenny et al. (US 2004/0112571 A1) reference cited by the Examiner does not include this arrangement of micropins. The Examiner cites FIGs. 10A – 10E as showing the elements of claim 1. (See page 2, paragraph 2 of the Office Action dated 1/4/2005 and) In FIGs. 10A – 10D, the micropins shown are arranged in straight, spaced-apart rows. Between the spaced-apart rows are straight lanes or channels along which a fluid can travel in a straight line through the device. By contrast, the micropins of the invention are positioned so that the fluid can not pass through the device along a straight path. One column of micropins is offset with respect to the adjacent column of micropins. Thus, there are no straight rows or lanes between the micropins that allow fluid to pass through the device on a straight path. This is shown in FIGs. 1B and 7A of the application being considered. The device shown in FIG. 10E, includes pillars 303 as well

as “radially distributed fins 303E” (See paragraph [0102] of Kenny et al.). The fins 303E are not micropins and are not arranged in a pixel like manner as recited in claim 1. In addition, the pins that are shown in FIG. 10 E are aligned so as to provide straight channels along which fluid can travel in a straight line past the micropins (called pillars in Kenney) through the Kenney et al. device.

As a result, claim 1, is not anticipated by Kenny et al. Accordingly, the rejection of claim1 under 35 USC § 102(e) as being anticipated by Kenny et al. (US 2004/0112571 A1) is now overcome.

Claims 2-4, 6-16 and 36-39 depend, directly or indirectly, from claim 1 and include its limitations by their dependency. As a result, the rejection of claims 2-4, 6-16 and 36-39 under 35 USC § 102(e) as being anticipated by Kenny et al. (US 2004/0112571 A1) is now also overcome.

In addition, the Kenny et al. reference does not appear to teach that the substrate includes “...an integrated circuit (IC) die” as recited in claim 3. Kenny et al. (US 2004/0112571 A1) also appears to fail to teach micropins having a “complex geometric shape” as recited in claim 15, or having a “nonsymmetrical shape” as recited in claim 36. In addition, the Kenny et al. reference fails to teach a cover, much less a “...cover including a plurality of micropins” as recited in claim 37. The pillars of Kenny et al. (US 2004/0112571 A1) are on the substrate. In addition, there is no teaching of positioning the micropins “...to cause a fluid passing through the plurality of micropins to travel a tortuous path” as recited in claim 38. In fact, the term tortuous does not appear in Kenny et al. (US 2004/0112571 A1). Applicant’s attorney did an electronic search of the document on the USPTO website and found no hits for the term tortuous in Kenny et al. (US 2004/0112571 A1).

Claim 17 recites “A heat exchange system comprising: a device having an inlet and an outlet, comprising...a...plurality of micropins arranged to facilitate flow of material across the plurality of micropins in at least two directions, and ...a heat exchanger, the heat exchanger having an inlet and an outlet, the inlet of the heat exchanger material transferably coupled to the outlet of the device, and the outlet of the heat exchanger material transferably coupled to the inlet of the pump.” The Kenny et al. (US 2004/0112571 A1) reference cited by the Examiner does not include this arrangement of micropins. The Examiner cites FIGs. 10A – 10E as showing the

elements of claim 1. (See page 2, paragraph 2 of the Office Action dated 1/4/2005) In FIGs. 10A – 10D, the micropins shown are arranged in straight, spaced-apart rows. Between the spaced-apart rows are straight lanes or channels along which a fluid can travel in a straight line through the device. The straight lanes or channels formed allow the fluid to pass through the device in a single direction. By contrast, the micropins of the invention, are positioned so that the fluid can not pass through the device along a straight path, and flow across the plurality of micropins in at least two directions, as recited in claim 17. One column of micropins is offset with respect to the adjacent column of micropins. Thus, there are no straight rows or lanes between the micropins that allow fluid to pass through the device on a straight path. This is shown in FIGs. 1B and 7A of Applicant's patent application. The device shown in FIG. 10E, includes pillars 303 as well as "radially distributed fins 303E" (See paragraph [0102] of Kenny et al.). The fins 303E are not micropins and are not arranged in a pixel like manner as recited in claim 17.

In addition, Kenny et al. also teaches a heat condenser 36 or 36' rather than a heat exchanger. As a result, claim 17 is not anticipated by Kenney et al. Accordingly, the rejection of claim 17 under 35 USC § 102(e) as being anticipated by Kenny et al. (US 2004/0112571 A1) is now overcome.

Claims 18-21 depend, directly or indirectly, from claim 17 and include its limitations by their dependency. As a result, the rejection of claims 18-21 under 35 USC § 102(e) as being anticipated by Kenny et al. (US 2004/0112571 A1) is now also overcome.

Claim 40 recites "...a cover disposed over the sidewalls of the substrate, the cover including a plurality of micropins coupled to the cover..." The Kenny et al. reference fails to teach a cover, much less a cover that includes micropins or a cover that is disposed over the sidewalls of the substrate. As a result, the rejection of claim 40 under 35 USC § 102(e) as being anticipated by Kenny et al. (US 2004/0206477 A) is overcome. Claims 41 and 42 depend directly from claim 40 and include its limitations by their dependency. As a result, the rejection of claims 41 and 42 under 35 USC § 102(e) as being anticipated by Kenny et al. (US 2004/0112571 A1) is now also overcome.

§103 Rejection of the Claims

Rejection: Claims 5 and 22-35 were rejected under 35 USC § 103(a) as being unpatentable over Kenny et al.

Response: In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference or references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)).

Claim 22 requires "...the micropins positioned to cause a fluid passing through the plurality of micropins to travel a nonstraight path..." As mentioned above, the Kenny et al. (US 2004/0112571 A1) reference cited by the Examiner does not include this arrangement of micropins. The Examiner cites FIGs. 10A – 10E as showing the elements of claim 1. In FIGs. 10A – 10D, the micropins shown are arranged in straight, spaced-apart rows. Between the spaced-apart rows are straight lanes or channels along which a fluid can travel in a straight line through the device. By contrast, the micropins of the invention are positioned so that the fluid can not pass through the device along a straight path. There are no channels as the rows of the micropins are shifted so that the fluid always encounters another micropin. This is shown in FIGs. 1B and 7A. The device shown in FIG. 10E, includes pillars 303 as well as "radially distributed fins 303E" (See paragraph [0102] of Kenny et al.). The fins 303E are not micropins and are not arranged in a pixel like manner as recited in claim 22. In addition, the Examiner admits that Kenney et al. fails to disclose the "...memory device coupled to the wiring board." (See page 3, paragraph 4 of the Office Action dated 1/4/2005 and page 3 of the Office Action dated 3/8/2006)). As set forth in *M.P.E.P.* § 2142, in a proper *prima facie* case of obviousness the prior art reference must teach or suggest all the claim limitations. Claim 22, as now amended, now recites three elements not taught or suggested in the Kenny et al. reference: the

wiring board, the memory device, and the micropins arranged to cause a fluid passing through the plurality of micropins to travel a nonstraight path. Simply put, Applicant's position is that the Examiner's position is an improper *prima facie* case of obviousness since it clearly fails to meet the requirements set forth in *M.P.E.P.* § 2142. Accordingly, the rejection of claim 22 under 35 USC § 103(a) as being unpatentable over Kenny et al. (US 2004/0112571 A1) is now overcome.

Claims 23-30 depend, directly or indirectly, from claim 22 and include its limitations by their dependency. As a result, the rejection of claims 23-30 under 35 USC § 102(e) as being unpatentable over Kenny et al. (US 2004/0112571 A1) is now also overcome.

In addition, the Examiner rejected claims 22-30 based solely on the Kenny et al. (US 2004/0112571 A1) reference. Applicant respectfully traverses the single reference rejection under 35 U.S.C. § 103 since not all of the recited elements of the claims are found in the Kenny et al. reference. Since all the elements of the claim are not found in the Kenney et al. reference, Applicant assumes that the Examiner is taking official notice of the missing elements. Applicant respectfully objects to the taking of official notice with a single reference obviousness rejection and, pursuant to *M.P.E.P.* § 2144.03, Applicant respectfully traverses the assertion of Official Notice and requests that the Examiner cite references in support of this position. Applicant also feels that the reasons for modification of the Kenney et al. reference, namely that the memory device attached to the wiring board is commonly used arrangement in the industry should be supported by a reference or an affidavit of personal knowledge.

Independent claim 31 (originally numbered 33 in the original filing) recites "...a plurality of micropins thermally coupled to the substrate, the plurality of micropins arranged to facilitate flow of material in a nonstraight path across the plurality of micropins in a pixel like pattern... a heat exchanger...a wiring board electrically coupled to the substrate; and a memory device electrically coupled to the wiring board." It is submitted that the Kenny et al. reference fails to teach or suggest many of the elements of this claim. As mentioned above, the Kenny et al. (US 2004/0112571 A1) reference cited by the Examiner does not include this arrangement of micropins. The Examiner cites FIGs. 10A – 10E as showing the elements of claim 1. In FIGs. 10A – 10D, the micropins shown are arranged in straight, spaced-apart rows. Between the spaced-apart rows are straight lanes or channels along which a fluid can travel in a straight line

through the device. By contrast, the micropins of the invention are positioned so that the fluid can not pass through the device along a straight path. This is shown in FIGs. 1B and 7A. The device shown in FIG. 10E, includes pillars 303 as well as “radially distributed fins 303E” (See paragraph [0102] of Kenny et al.). The fins 303E are not micropins and are not arranged in a pixel like manner as recited in claim 22. In addition, the Examiner admits that Kenney et al. fails to disclose the “...memory device coupled to the wiring board.” (See page 3, paragraph 4 of the Office Action dated 1/4/2005). In addition, claim 33 recites a heat exchanger. The Kelley et al. reference shows a heat condenser. As set forth in *M.P.E.P.* § 2142, in a proper *prima facie* case of obviousness the prior art reference must teach or suggest all the claim limitations. Claim 33, as now amended, now recites four elements not taught or suggested in the Kenny et al. reference: the wiring board, the memory device, the heat exchanger, and the micropins arranged to cause a fluid passing through the plurality of micropins to travel a nonstraight path. Simply put, Applicant feels that the Examiner’s has made an improper *prima facie* case of obviousness since it clearly fails to meet the requirements set forth in *M.P.E.P.* § 2142. *M.P.E.P.* § 2142 requires that the prior art reference teach or suggest all the claim limitations. Accordingly, the rejection of claim 31 under 35 USC § 103(a) as being unpatentable over Kenny et al (US 2004/0112571 A1).is now overcome.

Claims 32-35 (renumbered from 34-37) depend, directly or indirectly, from claim 31 and include its limitations by their dependency. As a result, the rejection of claims 32-35 under 35 USC § 102(e) as being unpatentable over Kenny et al. (US 2004/0112571 A1) is now also overcome.

In addition, the Examiner rejected claims 31-35 based solely on the Kenney et al. (US 2004/0112571 A1) reference. Applicant respectfully traverses the single reference rejection under 35 U.S.C. § 103 since not all of the recited elements of the claims are found in the Kenney et al. reference. Since all the elements of the claim are not found in the Kenney et al. (US 2004/0112571 A1) reference, Applicant assumes that the Examiner is taking official notice of the missing elements. Applicant respectfully objects to the taking of official notice with a single reference obviousness rejection and, pursuant to *M.P.E.P.* § 2144.03, Applicant respectfully traverses the assertion of Official Notice and requests that the Examiner cite references in support of this position. Applicant also feels that the reasons for modification of the Kenney et

al. reference, namely that the memory device attached to the wiring board is commonly used arrangement in the industry should be supported by a reference or an affidavit of personal knowledge.

Claim 5 also appears to have been rejected under 35 USC § 103(a) as being unpatentable over Kenny et al. Claim 5 depends from claim 1 and includes its recitations by its dependency. Claim 1 recites “...a plurality of micropins thermally coupled to the substrate, the plurality of micropins arranged in a pixel like pattern over the substrate, the micropins positioned to cause a fluid passing through the plurality of micropins to travel a nonstraight path.” The Kenny et al. (US 2004/0206477 A) reference cited by the Examiner fails to teach or suggest the arrangement of micropins as now recited. The Examiner cites FIGs. 10A – 10E as showing the elements of claim 1. (See page 2, paragraph 2 of the Office Action dated 1/4/2005) In FIGs. 10A – 10D, the micropins shown are arranged in straight, spaced-apart rows. Between the spaced-apart rows are straight lanes or channels along which a fluid can travel in a straight line through the device. By contrast, the micropins of the invention are positioned so that the fluid can not pass through the device along a straight path. This is shown in FIGs. 1B and 7A. The device shown in FIG. 10E, includes pillars 303 as well as “radially distributed fins 303E” (See paragraph [0102] of Kenny et al.). The fins 303E are not micropins and are not arranged in a pixel like manner as recited in claim 1. In addition to not having the arrangement of micropins, the Examiner admits that Kenny et al. does not have the diamond layer. Applicant feels that the Examiner’s has made an improper *prima facie* case of obviousness with respect to claim 5 since the Examiner clearly fails to meet the requirements set forth in M.P.E.P. § 2142 that requires that the prior art reference teach or suggest all the claim limitations. Accordingly, the rejection of claim 5 under 35 USC § 103(a) as being unpatentable over Kenney et al. (US 2004/0112571 A1) is now overcome.

In addition, the Examiner rejected claim 5 based solely on the Kenny et al. (US 2004/0112571 A1) reference. Applicant respectfully traverses the single reference rejection under 35 U.S.C. § 103 since not all of the recited elements of the claims are found in the Kenny et al. (US 2004/0112571 A1) reference. Since all the elements of the claim are not found in the Kenney et al. reference, Applicant assumes that the Examiner is taking official notice of the missing elements. Applicant respectfully objects to the taking of official notice with a single

reference obviousness rejection and, pursuant to *M.P.E.P.* § 2144.03, Applicant respectfully traverses the assertion of Official Notice and requests that the Examiner cite references in support of this position. Applicant also feels that the reasons for modification of the Kenny et al. reference, namely that the diamond film is a material having good thermal conductivity and being widely used in the industry as insufficient and should be supported by a reference or an affidavit of personal knowledge.

For all of the above stated reasons, the rejection of claims 5 and 22-35 under 35 USC § 103(a) as being unpatentable over Kenny et al. (US 2004/0112571 A1) is now overcome.

AMENDMENT UNDER 37 C.F.R. 1.116 – EXPEDITED PROCEDURE

Serial Number: 10/713,236

Filing Date: November 13, 2003

Title: MICROPIN HEAT EXCHANGER

Assignee: Intel Corporation

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Dkt: 884.C47US1 (INTEL)

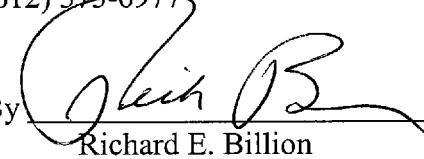
Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6977 to facilitate prosecution of this application. If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Signature

